Application of Ultra Thin Asphalt

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What is UTA?

• Placed to a compacted thickness \( \leq 20\text{mm} \)
• Usually combined with heavy PMB tack coat
• Utilises a heavily modified binder for improved shear strength and resistance to reflective cracking
• Thinner lifts mean \$\text{savings}
Te Puke Smoothing Project

- Te Puke Township, east of Tauranga
- Dual lane divided carriageway
- Urban (50 kph, kerbs, parking, etc.)
- 19,000 vpd
- Existing surface = 11 year old TNZ M/10 Mix15, dense graded asphalt, 40mm thick
Mix Types Used

• 20mm Dense Graded asphalt used for pre-seal repairs – ‘Mix 20’
• 7mm Ultra Thin Asphalt used on mid block sections – ‘UTA7’
• 14mm Stone Mastic Asphalt used on roundabouts – ‘SMA14’
## Mix Parameters

<table>
<thead>
<tr>
<th>Mix Type</th>
<th>Description</th>
<th>Stone Size</th>
<th>Binder Type</th>
<th>Thickness</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>UTA7</strong> (midblock)</td>
<td>Ultra Thin Asphalt</td>
<td>7mm</td>
<td>Infrabond HD (PMB)</td>
<td>25mm</td>
</tr>
<tr>
<td><strong>SMA14</strong> (roundabouts)</td>
<td>Stone Mastic Asphalt</td>
<td>14mm</td>
<td>60/70</td>
<td>50mm</td>
</tr>
<tr>
<td><strong>Mix20</strong> (patches)</td>
<td>Dense Graded Asphalt</td>
<td>20mm</td>
<td>60/70</td>
<td>50-100mm</td>
</tr>
</tbody>
</table>
Particle Size Distribution

% Passing vs. Sieve Size

- UTA7
- SMA14
Particle Size Distribution

% Passing vs. Sieve Size for UTA7, AC14, and SMA14.
Texture Depth - Increasing

- Existing Chipseal
- UTA7
- SMA14
- Existing AC14

**Mean Profile Depth (mm)**

- LWP
- RWP
- Threshold

Route Position:
- West
- East

Route:
- UTA7
- SMA14

Threshold: 0.5 mm
Texture Depth - Decreasing

- **Mean Profile Depth (mm)**
- **Route Position**
- **LWP**
- **RWP**
- **Threshold**

- **Existing Chipseal**
- **UTA7**
- **SMA14**
- **Mix20**
- **Existing AC14**

The graph shows the mean profile depth for different texture depths along the route position. The graph highlights the existing chipseal, UTA7, SMA14, Mix20, and AC14 for both left and right wheels (LWP and RWP) along the route from west to east.
Observations

- SMA14 has the best texture
- UTA7 has texture superior to AC14 and the Mix20
- Although Mix20 & existing AC14 have texture below threshold the skid resistance is higher than the UTA7
- Texture difference between SMA14 & other mixes is more pronounced than SCRIM difference
Observations

• Evidence of bitumen tracking in both directions influencing SCRIM measurement
• No obvious difference in SCRIM between SMA14 & UTA7
• There is an unexplained peak in the UTA7 SCRIM @ RP 1100m decreasing
Conclusions

• UTA7 holds promise for use in applications that require a moderate degree of texture
• UTA7 appears to have not yet developed its maximum skid resistance. Must review this following the next high speed survey
• Dense Graded Asphalt (both new Mix20 & older AC14) had good skid resistance. How long this last will be a function of the polishing resistance of the coarse aggregate